

### **REMARKS**

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-12 are presently active in this case. The present Amendment amends Claim 7 without introducing any new matter, and cancels Claims 13-19 without prejudice or disclaimer.

The outstanding Office Action rejected Claims 7-9, 12-15 and 18 under 35 U.S.C. §102(e) as anticipated by Cho et al. (U.S. Publication No. 2004/0114087, herein "Cho"). Claims 7-9 and 13-15 were rejected under 35 U.S.C. §102(e) as anticipated by Nishida et al. (U.S. Patent No. 6,842,207, herein "Nishida"). Claims 10 and 16 were rejected under 35 U.S.C. §103(a) as unpatentable over Nishida in view of Ochiai et al. (U.S. Patent No. 6,768,531, herein Ochiai). Claims 11 and 17 were rejected under 35 U.S.C. §103(a) as unpatentable over Nishida in view of Yi et al. (U.S. Publication No. 2003/0104291, herein Yi). Claims 7, 12-13 and 18 were rejected under 35 U.S.C. §103(a) as unpatentable over Yi in view of Nishida. Claims 1-6 are allowed.

Applicant acknowledges with appreciation the indication of allowable subject matter.

In response to the Restriction Requirement being made final, Claim 19, directed to non-elected invention, is canceled. Applicant reserves the right to present claims directed to the non-elected inventions in a divisional application, which shall be subject to the third sentence of 35 U.S.C. §121.<sup>1</sup>

In response to the rejections of Claims 13-18 under 35 U.S.C. §§102(e) and 103(a), Claims 13-18 are cancelled without prejudice or disclaimer.

To clarify Applicant's invention, independent Claim 7 is amended to recite "the dimensions of the first and second columnar spacers are defined as cross-sectional areas of

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<sup>1</sup> "A patent issuing on an application with respect to which a requirement for restriction under this section has been made ... shall not be used as a reference ... against a divisional application." See also MPEP 804.01.

the first and second columnar spacers in a horizontal plane parallel to the substrate.” The amendment finds non-limiting support in Applicant’s specification as originally filed, for example at page 17, lines 17-20. In light of the amendment to independent Claim 7, Applicant respectfully requests reconsideration of the rejections of Claims 7, 9-12 under 35 U S C. §103(a) over Manabe in view of Cho, and the rejection of Claim 8 under 35 U S C. §103(a) over Manabe and Cho in view of Nishida, and traverses these rejections, as discussed next.

The reference Manabe discloses a liquid display device including a pair of substrates with a shield pattern that is made of a resin of predetermined thickness.<sup>2</sup> However, Manabe fails to teach or suggest Applicant’s claimed first and second gap region, with a second gap smaller than the first gap; a first columnar spacer formed in the first gap region; and a second columnar spacer formed in the second gap region, wherein a dimension of the first columnar spacer is greater than a dimension of the second columnar spacer, the dimensions of the first and second columnar spacers are defined as cross-sectional areas of the first and second columnar spacers in a horizontal plane parallel to the substrate, as recited in amended, independent Claim 7. Applicant respectfully submits that in Manabe, a blue pixel, a green pixel and a red pixel have a gap of equal thickness, and the color filter layers 24G, 24B and 24R have an equal thickness of 3 $\mu$ m.<sup>3</sup> Accordingly, Manabe’s gaps of liquid crystal layer formed by two spacers 31 are of equal thickness.<sup>4</sup>

The reference Cho does also not remedy the deficiencies of the reference Manabe. In particular, Cho does not teach or suggest Applicant’s claimed dimension of the first columnar spacer being greater than a dimension of the second columnar spacer, the dimensions of the first and second columnar spacers are defined as cross-sectional areas of the first and second

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<sup>2</sup> See Manabe in the Abstract.

<sup>3</sup> See Manabe at column 4, lines 13-15.

<sup>4</sup> See Manabe at column 7, lines 58-59 and in Figures 1A and 3.

columnar spacers in a horizontal plane parallel to the substrate, in accordance with the difference of the gap thicknesses of the liquid crystal layer. Cho's spacers 322 and 321 are applied to regions with different gap thicknesses of the liquid crystal layer.<sup>5</sup> According to one embodiment of Cho, spacer 322 with a smaller contact area than spacer 321 is arranged in a region of a bigger gap and spacer 321 with a bigger contact area is arranged in the region of a smaller gap.<sup>6</sup> Spacer 322 is higher than spacer 321. Accordingly, the relationship between the gap of the liquid crystal layer and the contact area of the spacers *is opposite* to features claimed by Applicant's amended, independent Claim 7.

Furthermore, in another embodiment of Cho, the spacers 321, 322 and 323 are formed in respective regions with different gap thickness of the liquid crystal layer.<sup>7</sup> The spacers are also different in each contact area.<sup>8</sup> However, Cho further recites "[t]he different contact areas of the spacers 321-323 are obtained by forming spacer columns having the same thickness but having different top heights due to the different thickness of the color filters 230 and by pressing the spacer columns such that the top surfaces of the spacer columns have the same height."<sup>9</sup> In other words, since the gap of the region formed at spacer 321 is the smallest gap and spacer 321 is the highest spacer,<sup>10</sup> spacer 321 will be the most pressed of all spacers 321-323. Consequently, the contact area will become the biggest of all spacers 321-323. Accordingly, the relationship between the gap of the liquid crystal layer and the contact area of the spacer in Cho are *opposite* to Applicant's claims and therefore Cho teaches away from Applicant's invention.

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<sup>5</sup> See Cho in Figure 3.

<sup>6</sup> See Cho for example in paragraphs 52-53 and in corresponding Figure 3.

<sup>7</sup> See Cho in Figure 12.

<sup>8</sup> See Cho for example at page 6, paragraphs 116 and 121.

<sup>9</sup> See Cho at page 6, paragraph 116, and lines 6-12.

<sup>10</sup> See Cho for example in Figure 13.

Further, in the reference Nishida, all the spacers 26 are formed on the black matrix and are equal in height.<sup>11</sup> Nishida teaches that the granular spacer may be sprayed to control the thickness of the liquid crystal layer.<sup>12</sup> Nishida therefore also does not remedy the deficiencies of the references Manabe and Cho, since Nishida does not teach or suggest dimension of the first columnar spacer being greater than a dimension of the second columnar spacer, the dimensions of the first and second columnar spacers are defined as cross-sectional areas of the first and second columnar spacers in a horizontal plane parallel to the substrate, in accordance with the difference of the gap thicknesses of the liquid crystal layer, as recited in Applicants' Claim 7.

Therefore, even if the combination of Manabe, Cho and/or Nishida is assumed to be proper, the combination fails to teach every element of the claimed invention. Specifically, the combination fails to teach the claimed first and second gap region, with a second gap smaller than the first gap; a first columnar spacer formed in the first gap region; and a second columnar spacer formed in the second gap region, wherein a contact area of the first columnar spacer is greater than a contact area of the second columnar spacer. Accordingly, Applicant respectfully traverses, and requests reconsideration of, these rejections based on these patents.<sup>13</sup>

Consequently, in view of the present Amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-12 is earnestly solicited.

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<sup>11</sup> See Nishida for example in Figures 12A-C and 18.

<sup>12</sup> See Nishida for example at column 19, lines 5-17.

<sup>13</sup> See MPEP 2142 stating, as one of the three "basic criteria [that] must be met" in order to establish a *prima facie* case of obviousness, that "the prior art reference (or references when combined) must teach or suggest all the claim limitations," (emphasis added). See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

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